

TABLE 2—Estimated Production Costs for Garbanzo Beans, Los Angeles County, 1948.* (Calculated for dry land production with yields of 1,000 pounds per acre.)

Operations	Man labor hours	Tractor hours	Truck hours	\$ Cost per acre	\$ Cost per cwt.
LAND PREPARATION					
Subsoiling once.....	1.2	1.2	....	3.90	.39
Chiseling once.....	1.0	1.0	....	3.00	.30
Discing 3 times.....	1.5	1.5	....	4.87	.49
Miscellaneous.....	0.5	....	.5	1.00	.10
Sub-total.....	4.2	3.7	.5	12.77	1.28
PLANTING AND CULTIVATING					
Planting (8-row planter, 34-inch rows).....	2.0	0.5	.5	3.00	.30
Cultivating 3 times.....	1.5	1.5	....	3.00	.30
Sub-total.....	3.5	2.0	.5	6.00	.60
HARVESTING					
Cutting.....	.3	.3	....	0.60	.06
Windrowing.....	.3	.3	....	0.60	.06
Combine harvesting (contract).....	....	....	....	5.00	.50
Hauling.....	....	....	....	1.00	.10
Miscellaneous.....	....	....	....	1.00	.10
Sub-total.....	.6	.6	....	8.20	.82
MATERIAL					
Seed—30 pounds.....	....	....	....	4.50	.45
Sacks—10.....	....	....	....	2.50	.25
Miscellaneous.....	....	....	....	1.00	.10
Sub-total.....	....	....	....	8.00	.80
GEN. OVERHEAD					
Cash Overhead, Taxes..	....	....	....	8.00	.80
Machinery repairs.....	....	....	....	1.00	.10
Compensation ins.....	....	....	....	0.50	.05
Gen. expense†.....	....	....	....	1.74	.17
Sub-total.....	....	....	....	11.24	1.12
Depreciation.....	....	....	....	2.10	.21
Interest on investment, or rent.....	....	....	....	20.00	2.00
TOTAL COSTS.....	....	....	....	68.31	6.83

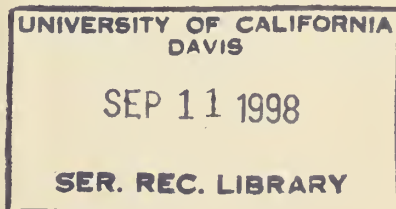
* Labor and field power computed at following rates: Man labor \$1–\$1.25 per hour; tractor \$1 and \$2 per hour; seed 15 cents per pound; sacks 25 cents each; hauling \$2 per ton; land value \$400; threshing \$5 per acre; interest 5 per cent.

† 5 per cent of first four sub-totals.

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RAISING GARBANZO BEANS IN CALIFORNIA

Ninety-seven per cent of all the garbanzo beans raised in the United States come from the southern coastal areas of California. The production in this section dates back to the founding of the Spanish Missions about a hundred and fifty years ago. According to the statistics compiled by the California Crop Reporting Service, the average yearly production for the past fourteen years has been 25,000 bags (100 lb.). Before 1935, garbanzos were listed in miscellaneous beans; no record prior to that year, therefore, is available.

What Is The Garbanzo Bean?

The garbanzo is a legume with the scientific name *Cicer arietinum* L. The specific name, *arietinum*, was derived from the latin word *aries*, meaning ram. The unique shape of the garbanzo seed resembles the curved horns of a ram's head, as may be seen in figure 1.

The name "garbanzo" is Spanish, probably corrupted from two Basque words—*grau*, meaning grain, and *antuzua*, meaning dry. In English-speaking countries, this bean is often known as the chickpea.

The plant is native to western Asia. Its culture in Egypt, Greece, and Italy dates back to ancient times. It is an important part of the diet of peoples of India, northern Africa, and Spain, ranking next to cereals. It has become a characteristic food of Latin peoples, who have carried it to all parts of the world. The garbanzo bean crop in California then is one of the heritages of the Spanish Missions.

The garbanzo plant is a branched herb growing one to two feet tall. The leaves resemble those of the locust, being odd-pinnate, with 7 to 15 pairs of oval-toothed leaflets. The flower is similar in form to the pea flower—white, solitary, and inconspicuous.

The pods are about one and one-half inches long and about one-half inch wide. They are inflated, each pod containing one or two large straw-colored seeds.

The light green herbage is sparsely covered with hairs. These exude a substance high in oxalic acid. It is poisonous to stock, and upon contact, may damage the clothing of workmen hoeing the crop.

What Is Its Food Value?

As a food the garbanzo compares fairly well with other beans and peas, its total digestible nutrients being about the

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Fig. 1—Garbanzo beans. About 1 and 1/3 actual size.

same. The digestible protein content is a little lower than in other beans. In fat content, however, only the velvet and soy bean are higher. The amount of fiber, most of which is in the tough seed coat, is about equal to that in the horse bean and the jack bean. The nitrogen-free extract, which is mostly carbohydrates, is lower than in most beans. It is nearer to that in peas and velvet beans.

For purposes of comparison, the chemical analyses of a number of beans and peas are given in table 1.

Garbanzo straw, unlike that of other bean varieties, has no value as livestock feed. Its high oxalic acid content makes it unpalatable and dangerous to use.

Where Do Garbanzos Grow Best?

For successful growing, garbanzos, like peas, require a cool climate with only a few light frosts. For this reason, the coastal counties of Southern California are best suited to the crop. Occasionally, however, scattered plantings are found in the interior valleys, though the climatic conditions are not often favorable for growth.

The specific areas of heavy production are all within ten miles of the sea coast. These are the Santa Ynez Valley in Santa Barbara County, the Upper Ojai Valley in Ventura County, and the Carlsbad, Otay Mesa, and Bonita areas in San Diego County. San Luis Obispo County is a minor producer also.

When Should You Plant Garbanzos?

In the southern coastal counties, garbanzos are planted in April. The annual rainfall in this area is from 9 to 20 inches, mostly in the winter and spring months. Irrigation is seldom applied. In San Diego County, with only 10 inches of rainfall, garbanzos are grown on dry land every second year, a crop year alternating with a fallow one.

In the interior valleys, they are usually planted in February. Fall planting has produced crops in the Sacramento Valley during very mild winters.

The Best Variety To Plant

The White Spanish is the variety mostly grown in California. Its mature beans weigh 36 to 50 to the ounce.

Since buyers grade the beans for size, only large white-seeded varieties are of commercial value. The term "white" is an exaggeration; the beans are actually light straw-colored.

How Much Seed Will You Need?

The planting rate used by growers varies considerably. From 14 to 35 pounds of seed to the acre is used. Under normal conditions, about 15 pounds is planted in San Diego County and 25 to 35 in Los Angeles County.

Either the "Ventura" or the plate-type planter may be used. The "Ventura" type, which has a pickup cup, distributes the seed evenly on flat, well-pulverized soil. On hilly, rough, or stony land, such as that used for much of this crop in San Diego County, the plate type is better.

The rows are usually 30 to 34 inches apart, with the spacings between plants from 6 to 18 inches, depending upon the season. In dry springs wider spacings are used.

Preparing the Seedbed

At planting time the seedbed should be firm and weed-free. This means that a number of separate tillage operations may be needed to get rid of weeds, conserve the soil moisture, and prepare the soil for planting.

Subsoiling, if practiced, should be done during the fall months.

Winter tillage includes at least one chiseling, one or more discings, and a spring-tooth harrowing before planting.

Improving Chances of a Good Crop

First of all, you must have the proper Rhizobium strain. The garbanzo bean, like other legumes, has a bacterium—*Rhizobium*—which produces nodules on the roots. These, in turn, assimilate nitrogen from the air. Most soils that have grown garbanzos are naturally inoculated with this bacterium. If the land is being planted to them for the first time, however, the seeds should be inoculated with the proper *Rhizobium* strain. The local Farm Advisor will assist in obtaining the right cultures of it.

Treatment with fungicides may be necessary, too. As the soil is often cold and wet at planting time, poor stands may result. The germinating seedlings may be killed by certain soil-borne fungi. Two of the fungi which cause most damage are *Pythium ultimum* and *Rhizoctonia solani*.

Treating the seed with fungicides is always good insurance when soil conditions are adverse. The number of surviving seedlings can be materially increased.

Spergon, Arasan, and Phygon (all proprietary compounds) have given equally good results in tests made in San Diego County.

Treatment with Spergon gives the seed a slick coating. If the grower is using a plate planter, this coating results in more even seed distribution. The seeds fall into the slots more easily, thus reducing the amount of cracking.

You must use the proper rate of application.

Four to six ounces of fungicide to the hundred pounds of seed is sufficient.

TABLE 1*—Analyses of Various Types of Beans and Peas (from "Feeds and Feeding" 21st Edition, Unabridged, 1948, by F. B. Morrison)

Type of bean	Number of analyses	Total dry matter	Digestible protein	Total digestible nutrients	Average total composition			
					Protein	Fat	Fiber	N-free extract Mineral matter
Common Beans:								
Field or Navy	27	90.0	20.2	78.7	22.9	1.4	4.2	57.3 4.2
Kidney	4	89.0	20.2	77.8	23.0	1.2	4.1	56.8 3.9
Pinto	7	89.9	14.6	67.6	22.5	1.2	4.1	57.7 4.4
Tepary bean	1	90.5	14.4	68.6	22.2	1.4	3.4	59.3 4.2
Lima bean	9	89.7	18.7	77.8	21.2	1.1	4.7	58.2 4.5
Mung bean	3	90.2	19.1	79.3	23.3	1.0	3.5	58.5 3.9
Cowpeas	45	89.0	19.2	76.0	23.4	1.4	4.0	56.7 3.5
Jack bean	5	99.3	20.7	81.7	24.7	3.2	8.2	50.4 2.8
Soy bean	452	90.0	33.7	87.6	37.9	18.0	5.0	24.5 4.6
Horse bean	5	87.5	22.1	73.4	25.7	1.4	8.2	48.8 3.4
Velvet bean	10	90.0	19.0	81.7	23.4	5.7	6.4	51.5 3.0
Peas:								
Field	15	90.7	20.1	77.9	23.4	1.2	6.1	57.0 3.0
Garden	12	89.2	21.8	76.9	25.3	1.7	5.7	53.6 2.9
Chickpea (garbanzo)	..	90.0	17.5	78.1	20.3	4.3	8.5	54.0 2.9

* Used with permission of F. B. Morrison.

Cultivation After the Crop Is In

The only tillage necessary is for weed control. The first cultivation should be made a few weeks after the seed is planted. Since garbanzos are usually grown without irrigation, few other tillages are needed.

The depth of cultivation should be just enough to destroy weeds. Working the soil too deeply may injure the root systems of the beans.

What Insects May Invade Your Garbanzo Field?

Several insect pests may invade the garbanzo field. Some of these are being controlled by insecticides, applied either by ground sprayers or by airplane dusting.

New insecticides are appearing on the market faster than they can be evaluated. Great harm can be done to one's own crop or to an adjacent one by injudicious use of insecticides.

Before applying any dust or insecticide, consult your local Farm Advisor.

Beet armyworms may eat the leaves of the young plants. They are likely to appear in the field during the first two months after the beans germinate. They usually disappear as the season progresses. *Control:* A light dusting with cryolite controls beet armyworms. Calcium arsenate is also effective but may cause leaf burning.

Migrations from drying vegetation can be checked by banding the exposed side of the field with a 2 to 4 inch ribbon of chlordane dust.

Flower or grass thrips are usually present each year. They migrate to the garbanzo fields and other green crops as the native grass begins to dry in the spring. Unless the population is very dense, direct damage is slight. Heavily infested plants become yellow and stunted. *Control:* Because the migrations are continuous, no economic control has yet been developed.

Leaf miners cause occasional damage. *Control:* None has been developed.

Cutworms and *wireworms* may cause losses by eating the germinating seed and the young root systems before the seedlings become established. *Control:* Recently, experimental seed treatments with new insecticides have given control of these worms on other crops, but safe dosages have not been established for garbanzos.

Your local Farm Advisor will have the latest information available on these insecticides.

Aphids may also cause damage. *Control:* Airplane dusting with Vapotone is one effective control. There are other chemicals which may prove useful, but the grower should consult his local Farm Advisor before using any of them.

Harvest

Garbanzo bean harvest begins in the latter part of July or early in August. A tractor-powered four-row cutter, which throws two rows together, is generally used for cutting the beans.

Windrows for curing and harvesting are made by throwing together four of the double rows left by the cutter. A side delivery rake is most often used for this purpose, although some piling is done with hay forks. This work should be done early in the morning, or when the plants are damp, to prevent shattering.

Most of the threshing is done with pickup threshers. A few stationary threshers are still in use for smaller plantings.

The cylinder speed of the thresher should be about 600 rpm. This is a little faster than for lima beans, but is much slower than for grain threshing.

Yields

Yields of garbanzo beans vary with the available water supply. In Los Angeles County they range from 1,000 to 1,400 pounds to the acre. In San Diego County, where the rainfall is less, they vary from 600 to 1,000 pounds.

The Market

Ordinarily a large part of the garbanzo bean crop is shipped to New York for consumption by people of Latin extraction, with whom it is a favorite food. Cuba and Puerto Rico have also been heavy buyers. Since the war, the United States Government has bought large quantities for aid to the southern European countries.

The small sizes and the culls are sold to poultry feed processors.

Costs

Because of the diverse conditions under which the crop is grown and of the varying dollar costs of labor and material, no definite figures can be given.

Table 2 presents an *estimated* cost per acre and per hundred-weight for a yield of 1,000 pounds. These estimates are based on growers' costs in Los Angeles County in 1948. Since this is a high-cost district, the figures are probably higher than the average in other areas.

The Los Angeles County figures break down into these cost percentages: land preparation, 19 per cent; planting and cultivating, 9 per cent; harvesting, 12 per cent; materials, 12 per cent; cash overhead, 16 per cent; depreciation, 3 per cent; and interest on investment or rent, 29 per cent.

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